

PATENT APPLICATION**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of

Docket No: Q87742

Tadahiro HIRAMOTO, et al.

Appln. No.: 10/533,340

Group Art Unit: 1616

Confirmation No.: 9312

Examiner: Konata M. GEORGE

Filed: February 6, 2006

For: **DEODORANT COMPOSITION****DECLARATION UNDER 37 C.F.R. § 1.132**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Tadahiro Hiramoto, hereby declare and state:

I received my Ph.D. degree from the Okayama University in March of 1993 for studies on the molecular mechanism of the interaction between barley and barley powder mildew.

I have been employed by the Takasago International Corporation since April of 1993, the assignee of the present application, where I had worked in the Central Research Laboratory of the Aroma Science & Technology Laboratory, conducting research regarding the development of functional food materials and the application of them to food products. Since July 2006, I have been a Director of 5th division in the Flavor Research in the Corporate Research & Development Division, conducting research regarding the development of functional food materials and the application of them to food products.

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I am a co-inventor of the invention described and claimed in the above-named application, and I am familiar with the subject matter disclosed by the application as well as the Office Action dated November 28, 2007 concerning the application.

In order to demonstrate the composition being used as a deodorant in Echigo et al is different from the presently claimed deodorant composition and the patentability of the present invention over Echigo et al in view of Yamashita et al, the mechanisms of eliminating or relieving odors of Echigo et al and that of the present invention are explained as follows, and additional experimental data are presented.

Mechanisms of eliminating or relieving odors

Echigo et al relates to an effective producing method for polymerizing phenolic compounds by acting an enzyme having a polyphenol oxidizing activity on phenolic compounds (lignin or lignin derivative), and deodorants and smell eliminators comprising the resulting polymer compounds are disclosed. See, col. 3, lines 10-15 and 54, and abstract. However, the effects of deodorants and smell eliminators are not disclosed.

With regard to the mechanism of polymeric reaction of Echigo et al, the following method was disclosed in "BACKGROUND ART" of Echigo et al.

In the polymeric reaction in which polyphenolic compounds are polymerized by an autooxidation of the polyphenolic compounds, phenolic compounds are effectively polymerized by the polymeric reaction in the alkaline pH region, since an optimal reaction pH region of the enzyme which functions as the catalyst is alkaline region.

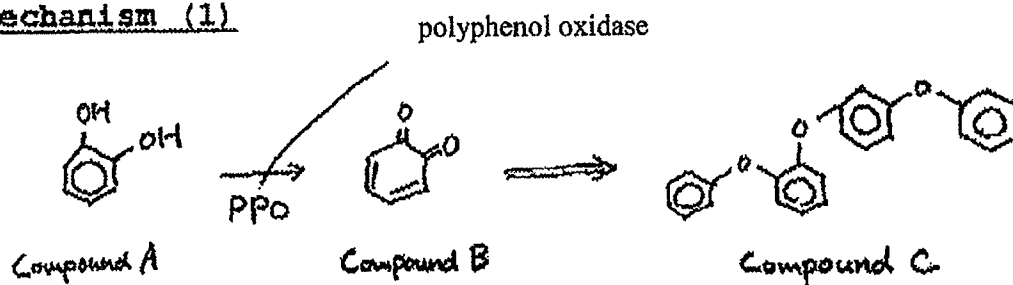
That is, the phenolic compounds are reacted with each other to be polymerized.

The mechanism of eliminating or relieving odors of Echigo et al is shown below.

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Mechanism (1)

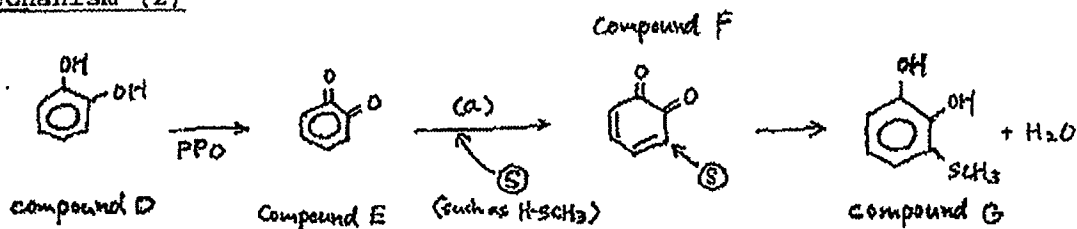


In Echigo et al, the polymerized composition (Compound C) itself has an effect of eliminating or relieving odors. Therefore, the composition of Echigo et al is a **polymer composition**. However, the mechanism of eliminating or relieving odors of the Compound C is not known.

In contrast, in the mechanism of eliminating or relieving odors of the present invention, a water-soluble lignin can be changed to a quinone structure by coexisting enzymes, and the quinone structure is reacted with odorant to eliminate or relieve the odors. See page 19, lines 12 to 18 of the specification. That is, the water-soluble lignin is reacted with the odorants.

The mechanism of eliminating or relieving odors of the present invention is shown below.

Mechanism (2)



In the present invention, eliminating or relieving odors mainly occurs in the process of the above reaction (a). The mechanism is that Compound E is rapidly reacted with odors such as

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H-SCH₃ before polymerizing. Therefore, the composition of the present invention is **low molecular composition** (Compound G).

As is shown from the above explanations, the mechanisms of eliminating or relieving odors between Echigo et al and the present invention are considerably different. Therefore, the formed compositions are also considerably different in that the composition of Echigo et al is polymer composition and the composition of the present invention is low molecular composition.

Additional Experimental Data

Additional experimentation was performed according to Example 19 at pages 35-37 of the specification. The experiment performed was one in which "sodium lignosulfonate" was used as a substitute for "calcium lignosulfonate" to prepare a product of the present invention. It is known that the sodium lignosulfonate and calcium lignosulfonate are low molecular compositions.

In Comparative Example 2, "1 mL of a 1% reaction mixture solution of sodium lignosulfonate and polyphenol oxidase + 1 mL of water" was used. The reaction mixture of sodium lignosulfonate and laccase is prepared according to column 12, line 61 to column 13, line 8 of the reference of Echigo et al (US 6,537,546) other than that a commercially available polyphenol oxidase as a polyphenol oxidase in an activity concentration of 1,800 U/liter is used, the reaction time was 72 hours, and the reaction mixture of sodium lignosulfonate and laccase was obtained by pulverizing after freeze-drying the obtained reaction product to powderize the same. The product prepared by Comparative Example 2 is a polymer composition and corresponds to that of Echigo et al.

The results are shown in the following table:

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		Measured (ppm)	Deodorization Ratio (%)
Comparative Example 1	Water alone (control)	200	-
Comparative Example 2	polymerizing reaction product + water	200	0
Example 1	calcium lignosulfonate + tyrosinase	0	100
Example 2	sodium lignosulfonate + tyrosinase	0	100

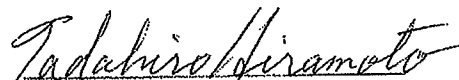
As seen from the table, Examples 1 and 2 were prepared from calcium lignosulfonate and sodium lignosulfonate, respectively, with an enzyme exhibiting a deodorizing effect when water-soluble lignin was present, and the ratio of eliminating odors was 100%.

In contrast, the ratio of eliminating odors in Comparative Example 2 (that of Echigo et al, using the polymerizing product) was 0%.

Accordingly, the present invention provides unexpectedly superior results and is patentable over Echigo et al in view of Yamashita et al.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: Apr. 7, 2008


Tadahiro Hiramoto